WHAT IS CLAIMED IS:

1. An adenoviral vector that mediates increased gene delivery *in vivo* comprising:

a targeting component that targets said vector to specific target cells; and

a tissue-specific promoter that drives the expression of a transgene carried by said vector in said target cells.

2. The adenoviral vector of claim 1, wherein said targeting component is selected from the group consisting of a targeting ligand incorporated into the fiber protein of said adenoviral vector by genetic mutation, a targeting ligand incorporated into a capsid protein of said adenoviral vector by genetic mutation, and a bi-specific molecule that binds to the knob protein of said adenoviral vector and a molecule expressed on said target cells.

3. The adenoviral vector of claim 2, wherein said bi-specific molecule is a bi-specific antibody conjugate linking a Fab fragment of an anti-Ad5 knob antibody with an anti-angiotensin converting enzyme antibody.

4. The adenoviral vector of claim 3, wherein said anti-Ad5 knob antibody is 1D6.14 and said anti-angiotensin converting enzyme antibody is 9B9.

5. The adenoviral vector of claim 4, wherein said tissue-specific promoter is selected from the group consisting of vascular endothelial growth factor type 1 receptor promoter, ICAM-2 promoter, vonWillebrand factor promoter and vascular endothelial growth factor receptor promoter.

6. The adenoviral vector of claim 5, wherein said target cells are pulmonary endothelial cells.

7. A method of gene delivery by adenoviral vector, comprising the step of:

contacting target cells with an adenoviral vector comprising a targeting component that targets said vector to specific target cells and a tissue-specific promoter that drives the expression of a transgene carried by said vector in said target cells, wherein said adenoviral vector has increased targeting specificity to said target cells and results in reduced transgene expression in non-target cells.

8. The method of claim 7, wherein the targeting component of said adenoviral vector is selected from the group consisting of a targeting ligand incorporated into the fiber protein of said adenoviral vector by genetic mutation, a targeting ligand incorporated into a capsid protein of said adenoviral vector by genetic mutation, and a bi-specific molecule that binds to the knob protein of said adenoviral vector and a molecule expressed on said target cells.

9. The method of claim 8, wherein said bi-specific molecule is a bi-specific antibody conjugate linking a Fab fragment of an anti-Ad5 knob antibody with an anti-angiotensin converting enzyme antibody.

10. The method of claim 9, wherein said anti-Ad5 knob antibody is 1D6.14 and said anti-angiotensin converting enzyme antibody is 9B9.

11. The method of claim 10, wherein the tissue-specific promoter of said adenoviral vector is selected from the group consisting of vascular endothelial growth factor type 1 receptor promoter, ICAM-2 promoter, vonWillebrand factor promoter and vascular endothelial growth factor receptor promoter.

12. The method of claim 11, wherein the target cells are pulmonary endothelial cells.